VirginiaTech
Invent the Future

Landsat 8 Research

"Making Multi-temporal Work" Research Team

R. H. Wynne (PI), V. Thomas (Presenter), C. Blinn, H. Burkhart, T. Fox, K. Boyle, K. Moeltner, S. Ball, J. Coulston, S. Peery

September 23, 2014

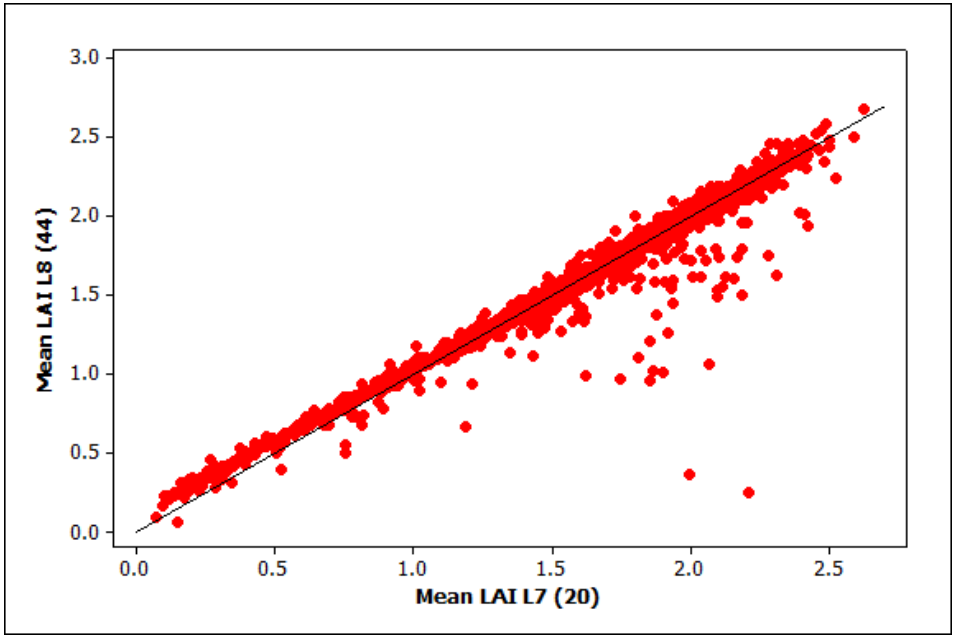
Leaf Area Index Estimation with Landsat 8

C. Blinn, R.H. Wynne et al.

Objectives

- To determine if currently used empirical equations for estimating LAI in loblolly pine stands from Landsat 5 & 7 (Flores et al. 2006) are usable with Landsat 8 or require updating
- Does improved SNR decrease RMSE?
- To compare L7 and L8 in terms of their ability to provide accurate LAI estimates
- Determine the impact of using thinned stands on LAI estimation
- Determine if cirrus band can improve estimation

Flores model for 1178 stands

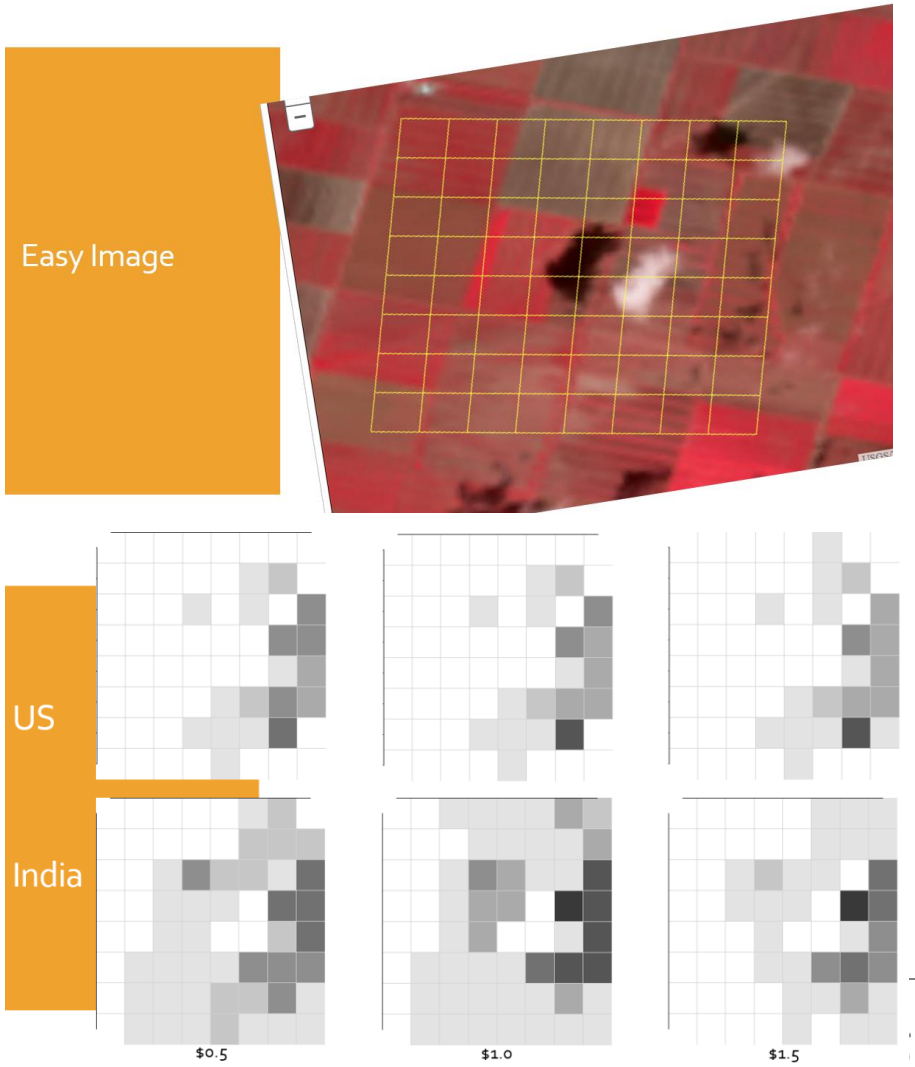


VirginiaTech
Invent the Future

Cloud identification with Amazon's Mechanical Turk

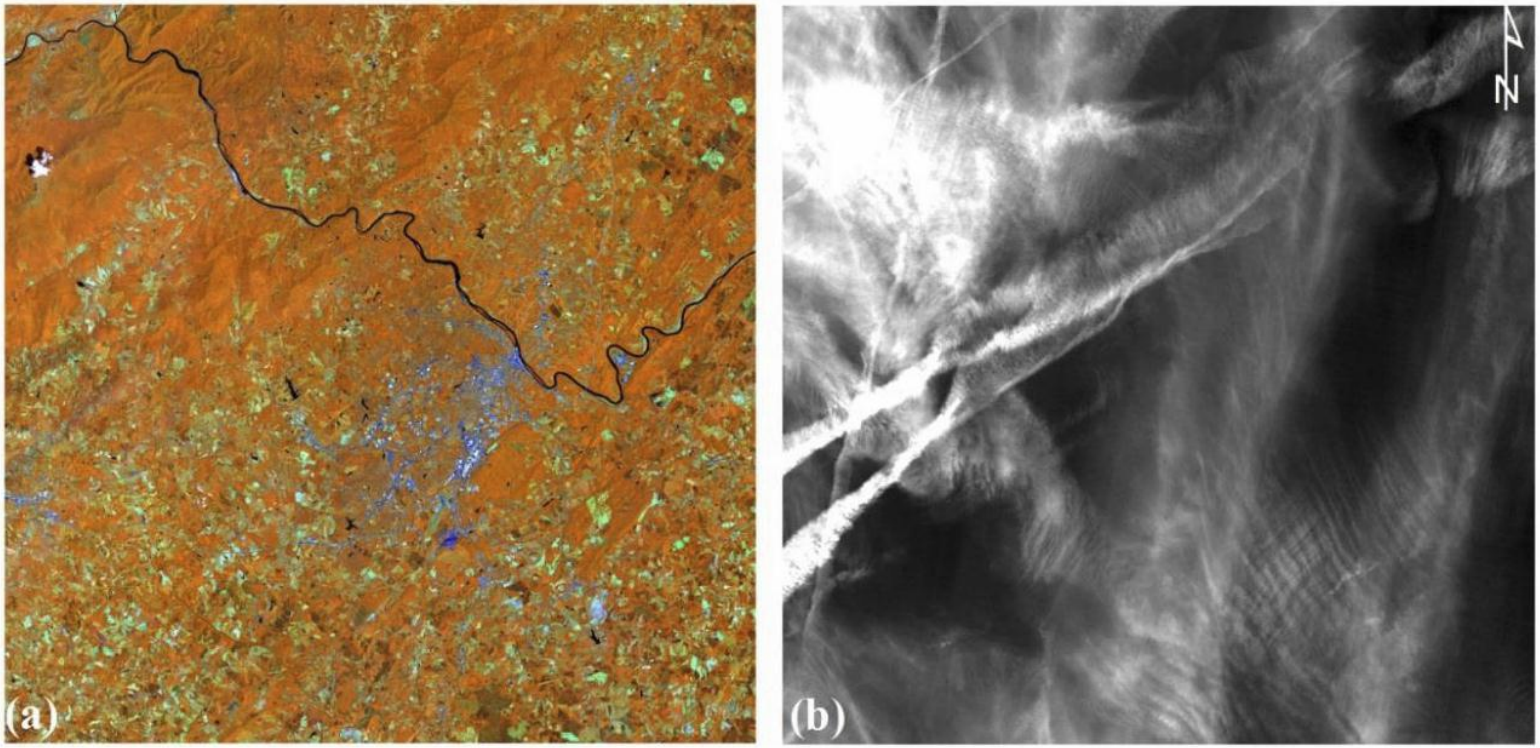
K. Moeltner, L. Wu et al.

- To study wage, image complexity, and possible learning or fatigue effects on the accuracy of cloud interpretation
- 3 phases, 6 versions, and 3 images for each version. Total of 54 different conditions for each tile.
- No observed wage effect on accuracy
- Fatigue effect evident
- Gender effect evident
- Regional effect evident



Accounting for Cirrus in Classifications

G. Anderson and R.H. Wynne

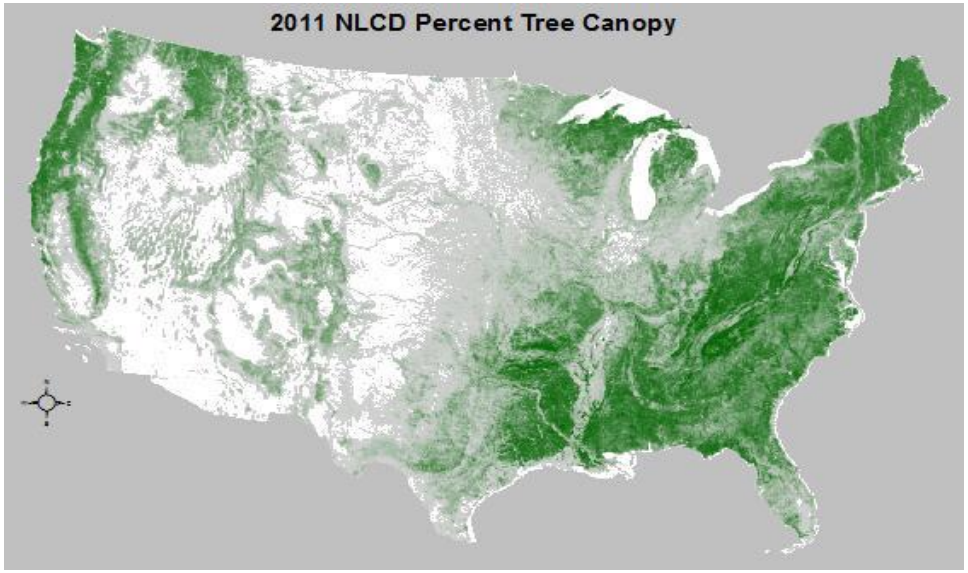


- Initial result suggest that by filtering out cirrus cloud reflectance, classification accuracy is generally improved, especially in highly impacted urban areas.

NLCD Tree Canopy Cover and Change

J. Coulston (USFS FIA), Virginia Tech Team

2011 map completed in 2014



Current research focus

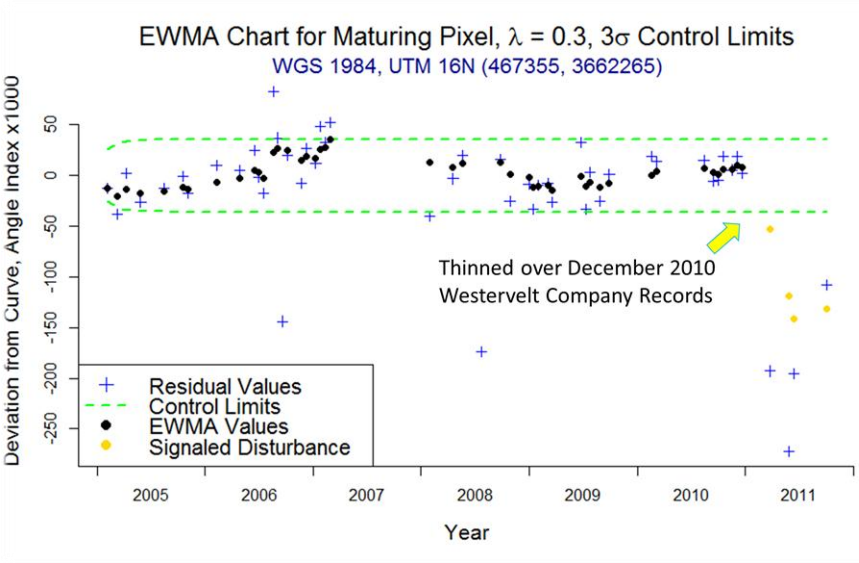
- Develop approach for 2016 tree canopy cover map
  - Understand the capacity to responsibly identify
    - Subtle change
    - Abrupt change
  - Test a suite of Landsat time-series approaches to predict 2016 status and 2011-2016 change. Examples:
    - VCT
    - Time series control charts
- Examine the potential role of lidar for post 2016 efforts.

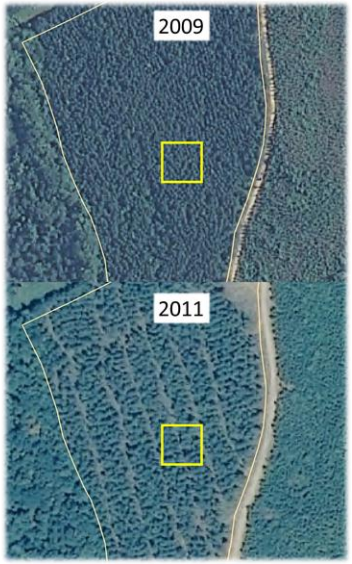
VirginiaTech
Invent the Future

Monitoring Land-Use Change in Central Java with Statistical Process Control Charts

E. Brooks, J. A. Cardille, R.H. Wynne, and V. A. Thomas

- Exponentially Weighted Moving Average Change Detection (EWMACD, Brooks et al., 2014) has been shown to detect subtle land-use changes using Landsat stacks
  - Prior studies conducted in relatively "friendly" conditions
  - Interest in testing EWMACD in a more challenging setting





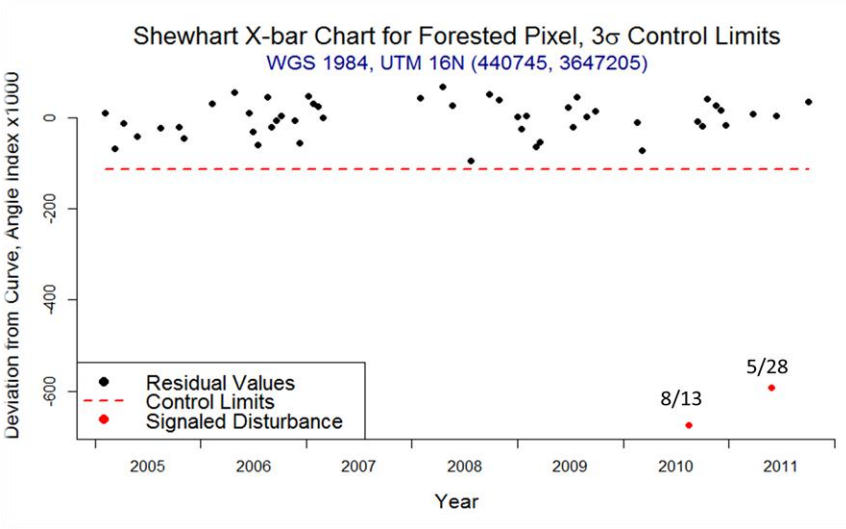
Source: Brooks et al. 2013. "On-the-Fly Massively Multitemporal Change Detection Using Statistical Quality Control Charts and Landsat Data." IEEE Transactions on Geosciences and Remote Sensing, 52(6), 3316-3332.

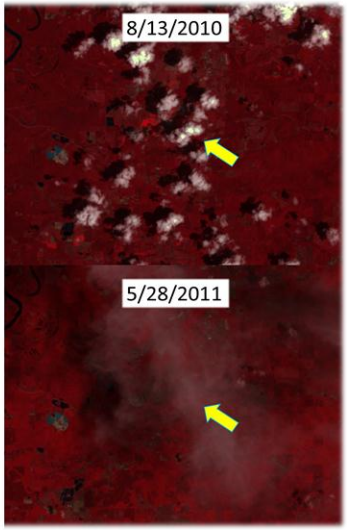
VirginiaTech
Invent the Future

Using Multitemporal Information to Capture Singular Instances of Clouds and Shadows

P. Joshi, R.H. Wynne, E.B. Brooks, and V.A. Thomas

- Prior work suggests was that harmonic regression could be used to filter out “flash anomalies”
  - Clouds, cloud shadows, short-lived obstructions, data glitches
  - Experiment ongoing to test this with Landsat 8





Source: Brooks et al. 2013. “On-the-Fly Massively Multitemporal Change Detection Using Statistical Quality Control Charts and Landsat Data.” IEEE Transactions on Geosciences and Remote Sensing, 52(6), 3316-3332.

VirginiaTech
Invent the Future

Thank you!